AMENDMENT TO THE CLAIMS

Claims 1-25 (**Cancelled**)

26.(New) A standard model creating apparatus for creating a standard model which shows an acoustic characteristic having a specific attribute and is used for speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said standard model creating apparatus comprising:

a reference model storing unit operable to store at least one reference model which is a probability model showing an acoustic characteristic having a specific attribute;

a reference model selecting unit operable to select at least one reference model from among the at least one reference model stored in said reference model storing unit, on the basis of usage information regarding an attribute which is an object of speech recognition; and

a standard model creating unit operable to create the standard model by calculating statistics of the standard model using statistics of the at least one reference model selected by the reference model selection unit,

wherein said standard model creating unit includes:

a standard model structure determining unit operable to determine a

structure of the standard model which is to be created;

an initial standard model creating unit operable to determine initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating unit operable to estimate and calculate the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model.

27.(New) The standard model creating apparatus according to claim 26, further comprising

a usage information creating unit operable to create the usage information,

wherein said reference selecting unit is operable to select at least one reference model from among the at least one reference model stored in said reference model storing unit, on the basis of the created usage information.

28.(New) The standard model creating apparatus according to claim 26, being connected to a terminal apparatus via a communication channel, further comprising

a usage information receiving unit operable to receive the usage

information from said terminal apparatus,

wherein said reference model selecting unit is operable to select at least one reference model from among the at least one reference model stored in said reference model storing unit, on the basis of the received usage information.

29.(New) A standard model creating apparatus for creating a standard model which shows an acoustic characteristic having a specific attribute and is used for speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said standard model creating apparatus comprising:

a reference model storing unit operable to store at least one reference model which is a probability model showing an acoustic characteristic having a specific attribute; and

a standard model creating unit operable to create the standard model by calculating statistics of the standard model using statistics of the at least one reference model stored in said reference model storing unit,

wherein said standard model creating unit includes:

a standard model structure determining unit operable to determine a structure of the standard model which is to be created, on the basis of at least one of: specification information regarding specifications of the standard model

which is to be created; and usage information regarding an attribute which is an object of speech recognition;

an initial standard model creating unit operable to determine initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating unit operable to estimate and calculate the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model.

30.(New) The standard model creating apparatus for speech recognition according to claim 29,

wherein the specification information shows at least one of: a type of an application program which uses the standard model; and specifications of an apparatus which uses the standard model.

31.(New) The standard model creating apparatus for speech recognition according to claim 29,

wherein the attribute includes information regarding at least one of: an age; a gender; a texture of a speaker's voice; a tone of voice changed with emotions or health condition; a speaking rate; civility in utterance; a dialect; a

type of background noise; loudness of background noise; an S/N ratio between speech and background noise; a microphone quality; and a degree of complexity in recognizable vocabulary.

32.(New) The standard model creating apparatus according to claim 29, further comprising

a specification information holding unit operable to hold an application/specifications correspondence database showing a correspondence between an application program which uses the standard model and specifications of the standard model,

wherein said standard model structure determining unit is operable to read specifications corresponding to an application program to be activated from the application/specifications correspondence database held by said specification information holding unit, and to determine the structure of the standard model on the basis of the read specifications.

33.(New) The standard model creating apparatus according to claim 29, further comprising

a specification information creating unit operable to create the specification information,

wherein said standard model structure determining unit is operable to

determine the structure of the standard model on the basis of the created specification information.

34.(New) The standard model creating apparatus according to claim 29, being connected to a terminal apparatus via a communication channel, further comprising

a specification information receiving unit operable to receive the specification information from said terminal apparatus,

wherein said standard model structure determining unit is operable to determine the structure of the standard model on the basis of the received specification information.

35.(New) The standard model creating apparatus according to claim 29,

wherein each of the reference model and the standard model is expressed using at least one Gaussian distribution, and

said standard model structure determining unit is operable to determine at least the number of Gaussian mixture distributions as the structure of the standard model.

36.(New) A standard model creating apparatus for creating a standard model which shows an acoustic characteristic having a specific attribute and is used for

speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said standard model creating apparatus comprising:

a reference model storing unit operable to store at least one reference model which is a probability model showing an acoustic characteristic having a specific attribute; and

a standard model creating unit operable to create the standard model by calculating statistics of the standard model using statistics of the at least one reference model stored in said reference model storing unit,

wherein said standard model creating unit includes:

a standard model structure determining unit operable to determine a structure of the standard model which is to be created;

an initial standard model creating unit operable to determine initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating unit operable to estimate and calculate the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model,

wherein each of the reference model and the standard model is expressed using at least one Gaussian distribution,

said reference model storing unit is operable to store a pair of reference models, each having at least a different number of Gaussian mixture distributions, and

said statistics estimating unit is operable to calculate the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model with respect to the pair of reference models.

37.(New) A standard model creating apparatus for creating a standard model which shows an acoustic characteristic having a specific attribute and is used for speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said standard model creating apparatus comprising:

a reference model storing unit operable to store at least one reference model which is a probability model showing an acoustic characteristic having a specific attribute;

a reference model preparing unit operable to perform at least one of: obtaining a reference model from an outside source and storing the obtained reference model into said reference model storing unit; and creating a new reference model and storing the new reference model into said reference model storing unit, as well as at least one of updating and adding to the reference model stored in said reference model storing unit; and

a standard model creating unit operable to create the standard model by calculating statistics of the standard model using statistics of the at least one reference model stored in said reference model storing unit,

wherein said standard model creating unit includes:

a standard model structure determining unit operable to determine a structure of the standard model which is to be created;

an initial standard model creating unit operable to determine initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating unit operable to estimate and calculate the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model.

38.(New) The standard model creating apparatus according to claim 37,

wherein said reference model preparing unit is operable to perform at least one of an update and an addition to the reference model stored in said reference model storing unit, on the basis of at least one of: usage information regarding an object of recognition; and specification information regarding specifications of the standard model which is to be created.

39.(New) The standard model creating apparatus according to claim 37, further comprising:

a similarity information creating unit operable to create,

on the basis of the reference model stored in said reference model storing unit and at least one of: specification information regarding specifications of the standard model which is to be created; and usage information regarding an attribute which is an object of speech recognition,

similarity information showing a degree of similarity to the reference model and at least one of the usage information and the specification information,

wherein said reference model preparing unit is operable to determine whether or not to perform at least one of an update and an addition to the reference model stored in said reference model storing unit, on the basis of the similarity information created by said similarity information creating unit.

40.(New) A standard model creating apparatus for creating a standard model which shows an acoustic characteristic having a specific attribute and is used for speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said standard model creating apparatus comprising:

a reference model storing unit operable to store at least one reference

model which is a probability model showing an acoustic characteristic having a specific attribute; and

a standard model creating unit operable to create the standard model by calculating statistics of the standard model using statistics of the at least one reference model stored in said reference model storing unit,

wherein said standard model creating unit includes:

a standard model structure determining unit operable to determine a structure of the standard model which is to be created;

an initial standard model creating unit operable to determine, on the basis of a class ID that identifies a type of the standard model, initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating unit operable to estimate and calculate the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model.

41.(New) The standard model creating apparatus according to claim 40,

wherein said initial standard model creating unit is operable to specify the class ID from the reference model and to determine initial values associated with the specified ID as the initial values.

42.(New) The standard model creating apparatus according to claim 41,

wherein said initial standard model creating unit is operable to hold a correspondence table showing a correspondence among the class ID, the initial values, and the reference model, and to determine the initial values in accordance with the correspondence table.

43.(New) The standard model creating apparatus according to claim 42,

wherein said initial standard model creating unit is operable to generate the correspondence table by creating, or by obtaining from an outside source, an initial standard model with a class ID, that is, initial values associated with the class ID, or a reference model with a class ID, that is, a reference model associated with the class ID.

44.(New) A method of creating a standard model which shows an acoustic characteristic having a specific attribute and is used for speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said method comprising:

a reference model reading step of selecting and reading, on the basis of usage information regarding an attribute which is an object of speech recognition, at least one reference model from a reference model storing unit

which is operable to store at least one reference model that is a probability model showing an acoustic characteristic having a specific attribute; and

a standard model creating step of creating the standard model by calculating statistics of the standard model using statistics of the at least one reference model read in said reference model reading step,

wherein said standard model creating step includes:

a standard model structure determining sub-step of determining a structure of the standard model which is to be created;

an initial standard model creating sub-step of determining initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating sub-step of estimating and calculating the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model.

45.(New) A program for a standard model creating apparatus which creates a standard model that shows an acoustic characteristic having a specific attribute and that is used for speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said program comprising:

a reference model reading step of selecting and reading, on the basis of usage information regarding an attribute which is an object of speech recognition, at least one reference model from a reference model storing unit which is operable to store at least one reference model that is a probability model showing an acoustic characteristic having a specific attribute; and

a standard model creating step of creating the standard model by calculating statistics of the standard model using statistics of the at least one reference model read in said reference model reading step,

wherein said standard model creating step includes:

a standard model structure determining sub-step of determining a structure of the standard model which is to be created;

an initial standard model creating sub-step of determining initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating sub-step of estimating and calculating the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model.

46.(New) A method of creating a standard model which shows an acoustic characteristic having a specific attribute and is used for speech recognition,

using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said method comprising:

a reference model reading step of reading at least one reference model from a reference model storing unit which is operable to store at least one reference model that is a probability model showing an acoustic characteristic having a specific attribute; and

a standard model creating step of creating the standard model by calculating statistics of the standard model using statistics of the at least one reference model that has been read,

wherein said standard model creating step includes:

a standard model structure determining sub-step operable to determine a structure of the standard model which is to be created, on the basis of at least one of: specification information regarding specifications of the standard model which is to be created; and usage information regarding an attribute which is an object of speech recognition;

an initial standard model creating sub-step of determining initial values of the statistics specifying the standard model whose structure has been determined; and

a statistics estimating sub-step of estimating and calculating the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined,

with respect to the reference model.

47.(New) A program for a standard model creating apparatus which creates a standard model which shows an acoustic characteristic having a specific attribute and is used for speech recognition, using a probability model that expresses a frequency parameter showing an acoustic characteristic as an output probability, said method comprising:

a reference model reading step of reading at least one reference model from a reference model storing unit which is operable to store at least one reference model that is a probability model showing an acoustic characteristic having a specific attribute; and

a standard model creating step of creating the standard model by calculating statistics of the standard model using statistics of the at least one reference model that has been read,

wherein said standard model creating step includes:

a standard model structure determining sub-step operable to determine a structure of the standard model which is to be created, on the basis of at least one of: specification information regarding specifications of the standard model which is to be created; and usage information regarding an attribute which is an object of speech recognition;

an initial standard model creating sub-step of determining initial values of

the statistics specifying the standard model whose structure has been determined; and

a statistics estimating sub-step of estimating and calculating the statistics of the standard model so as to maximize or locally maximize a probability or a likelihood of the standard model, whose initial values have been determined, with respect to the reference model.